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| EXAMINER |
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BROWN, COURTNEY A

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| ART UNIT | PAPER NUMBER |
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1609

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10/04/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/508,837

Applicant(s)

GROSSMANN ET AL.

Examiner

Courtney A. Brown

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-14 is/are pending in the application.
- 4a) Of the above claim(s) 11-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claims 2-14 are pending.

Restriction

Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions, which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

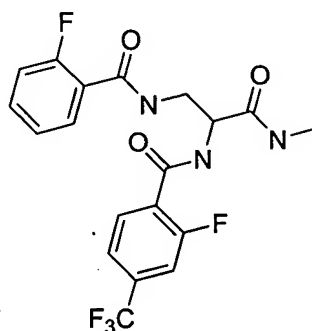
In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claims 2-10 drawn to a method for identifying herbicidally active substances comprising the steps of bringing one or more enzymes selected from the group consisting of the enzymes tryptophan aminotransferase, indole-3-pyruvate decarboxylase, and indole-3-acetaldehyde oxidase into one or more test substance(s) under conditions which permit the binding of the test substance to one of the said enzymes and detecting if the test substance reduce or block transcription, translation, expression, or activity of the said enzymes.

Group II, claims 11-14, drawn to a method for controlling undesired vegetation which comprises applying a compound with herbicidal growth-regulatory activity to the vegetation wherein the compound inhibits one or more compound selected from the group consisting of the enzymes tryptophan aminotransferase, indole-3-pyruvate

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decarboxylase, and indole-3-acetaldehyde oxidase. Also drawn to the compound of formula (I).



The inventions listed as Groups I-II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the common technical feature in all groups deal with the inhibition of one or more enzymes selected from the group consisting of tryptophan aminotransferase, indole-3-pyruvate decarboxylase, and indole-3-acetaldehyde oxidase. This concept cannot be a special technical feature under PCT Rule 13.2 because this concept is shown in prior art. Miyata et al. (Physiologia Plantarum, volume 51, pages 402-406, April 1981) teaches that indole-3-acetaldehyde oxidase is strongly inhibited by *p*-hydroxymercuribenzoate, cyanide, and hydroxylamine. The invention of the instant application lacks a special corresponding technical feature and does not make a contribution to the prior art. Therefore, the claims cannot be said to have unity of invention.

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During a telephone conversation with Barbara Schwalge on September 22, 2007 a provisional election was made with traverse to prosecute the invention of group I, claims 2-10. Affirmation of this election must be made by applicant in replying to this Office action. Claims 11-14 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bower et al. in view of all of Anderson et al. (U.S. 5877117), Rapparini et al, Normanly, Koshiba(I) et al. (Plant Physiology, 1993), and Koshiba(II) et al.(EP 0834558).

Applicant's Invention

Applicant claims a method for identifying a herbicidally active substance comprising: a.) bringing one or more enzymes selected from the group consisting of the enzymes tryptophan aminotransferase, indole-3-pyruvate decarboxylase, and indole -3-acetaldehyde oxidase into contact with one or more test substances to permit binding to the enzymes or the nucleic acid sequence, which encodes the said enzymes; b.) detecting if the test substance reduce or block transcription, translation or expression of at least one of the said enzymes; and c.) detecting if the test substance(which could be trpytophan, a tryptophan derivative, indole-3-pyruvate, an

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indole-3- pyruvate derivative, an indole-3- acetaldehyde or an indol-3-acetaldehyde derivative) reduces or blocks activity of at least one of the said enzymes or detecting if the test substance binds to one of the said enzymes(preferably tryptophan aminotransferase). Applicant also claims a method of identifying herbicidally active substance that comprises: a.) treating a test compound with a plant cell lysate which comprises at least one of the said enzymes or; b.) treating a test compound with one of the said enzymes which are either partially or fully purified and ;c.) the enzymatic activity of at least one of the said enzymes is determined in comparison with one of the other said enzymes that has or has not been treated with the test compound and selecting the compounds that reduce or block the activity of at least one of the said enzymes.

***Determination of the scope and the content of the prior art
(MPEP 2141.01)***

Bower et al. teach the inhibition of indoleacetaldehyde oxidase activity by 2, 4-dichlorophenoxyacetic acid in auxin synthesis in cucumber (see page 107). Bower et al. also teach that indole-3-acetaldehyde may serve as an alternative substrate because it partially inhibits the oxidation of indole-3-acetaldehyde (see abstract).

***Ascertainment of the difference between the prior art and the claims
(MPEP 2141.02)***

Bower et al. do not teach a method for identifying herbicidally active substances comprising the steps previously mentioned.

Anderson et al. teach that auxin transport inhibitors are compounds which themselves are herbicides and act by inhibiting transmembrane movement of auxin which accumulates in the cells and affects plant growth (column1, lines 23-25). In reference to claim 10, Anderson et al., in claims 13 and 14 and in column 7, lines 63-67, disclose an auxin transport inhibitor in combination with other herbicide(s) being applied directly to weeds. In column 8, lines 28-36, this reference teaches that after application, the response of these weeds were observed

Rapparini et al. teach that auxins are a class of hormones that promote the lengthwise growth of plants. Auxins have a role in other cellular activities as well, such as cell division and differentiation, fruit development, root formation from cuttings, and in abscission. This reference also teaches that the key auxin, indole-3-acetic acid (IAA), has been implicated in the regulation of virtually every aspect of plant development, from embryogenesis through senescence (abstract).

Normanly teaches that plant IAA biosynthesis research has focused on degradation of tryptophan by sequential oxidative deamination and decarboxylation. This reference discloses that several recent model systems have been used by investigators to show that IAA biosynthesis occurs via two separate pathways--tryptophan-dependent and tryptophan-independent (page 431).

Koshiba(I) et al. teach that the enzymes tryptophan aminotransferase, indole-3-acetaldehyde oxidase, and indole-3-pyruvate decarboxylase are involved in IAA biosynthesis(p 1319).

Koshiba(II) et al. disclose an indoleacetaldehyde oxidase gene from maize that is used to begin the suppression of gene activity using antisense sequences that curb auxin activity and prevent the growth of plants. It also allows plant dwarfing. (page 2, lines 1-11 and page 5, lines 10-21).

Finding of prima facie obviousness

Rationale and Motivation (MPEP 2142-2143)

It would have been obvious to a person of ordinary skill in the art at the time of the instant application to combine the teachings of Bower et al., Anderson et al., Rapparini et al., and Koshiba(I and II) et al. to devise a method for identifying a herbicidally active substance comprising the steps mentioned above. The biosynthesis of the key auxin, indole-3-acetic acid (IAA), is tryptophan-dependant (as shown in the scheme I). The enzymes tryptophan aminotransferase, indole-3- acetaldehyde oxidase, and indole-3-pyruvate decarboxylase are involved in IAA biosynthesis. A compound or substrate that can inhibit (by binding to the enzyme or to the nucleic acid sequence encoding the enzyme) these enzymes would therefore inhibit the production of IAA and subsequently prevent plant growth.

Claims 2 and 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bower et al. in view of all of Anderson et al. (U.S. 5877117), Rapparini et al, Normanly, Koshiba(I) et al. (Plant Physiology, 1993), and Koshiba(II) et al.(EP 0834558) in further view of Bode.

Applicant's Invention

Applicant further limits claim 2 c.) detecting if the test substance where the compounds tryptophan, a tryptophan derivative, indole-3-pyruvate, an indole-3-pyruvate derivative, an indole-3- acetaldehyde or an indol-3- acetaldehyde derivative could serve as substrates and the enzymatic activity is measured by increase or decrease in concentrations of one or a combination of the enzymes(L-tryptophan, indole-3-pyruvate, indole-3-acetaldehyde, indole-3-acetic acid, or indole-3-butyric acid) .

***Ascertainment of the difference between the prior art and the claims
(MPEP 2141.02)***

Bower et al. do not teach detecting if the test substance or substrate (which could be tryptophan, a tryptophan derivative, indole-3-pyruvate, indole-3- pyruvate derivative, indole-3- acetaldehyde or an indol-3- acetaldehyde derivative) reduce or block the activity of one or more of the ~~said~~ enzymes by measuring the increase or decrease in concentrations of one or a combination of the enzymes(L-tryptophan, indole-3-pyruvate, indole-3-acetaldehyde, indole-3-acetic acid, or indole-3-butyric acid) .

Bode et al. teach assaying the activity of tryptophan aminotransferase by measuring the amount of indolepyruvate (indole-3-pyruvate) formed (page 388).

Finding of prima facie obviousness

Rationale and Motivation (MPEP 2142-2143)

It would have been obvious to a person of ordinary skill in the art at the time of the instant application to combine the teachings of Anderson et al. and Bode et al. to determine the activity of an enzyme by measuring the concentration of another enzyme that is involved in the same biosynthesis in which it is involved. In a chemical reaction, where a specific substrate for that particular enzyme is used, there will naturally be a decrease in the concentration or amount of product formed. Measuring the amount of the formed products that play a role in this same reaction scheme determines if that substrate affects the overall reaction scheme that indicates if the substrate successfully blocked the activity of the enzyme. Additionally, this is a common method to one skilled in the art to measure enzyme activity.

Claims 2 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bower et al. in view of all of Anderson et al. (U.S. 5877117) , Rapparini et al, Normanly, Koshiba(I) et al. (Plant Physiology, 1993), and Koshiba(II) et al.(EP 0834558) in further view of Vanmaele et al. (US 6783735).

Applicant's Invention

The claimed invention is further limited to a method for identifying a herbicidally active substance where the enzymatic activity is determined spectroscopically; the test substances are identified in the form of a high-throughput-screening, and the compound selected is applied to a plant to verify herbicidal activity.

***Ascertainment of the difference between the prior art and the claims
(MPEP 2141.02)***

Bower et al. do not teach a method of identifying herbicidally active substance where the enzymatic activity is determined spectroscopically and the test substances are identified in the form of a high-throughput-screening.

In reference to claim 8, Koshiba(I) et al. teach, on page 1320, a method where indole-3-acetaldehyde oxidase activity is assayed via HPLC (high performance liquid chromatography), which is a popular method of chemical analysis.

In reference to claim 9, Vanmaele et al. teach HTS(High Throughput Screening) of libraries of chemical compounds, biologically active compounds and cells to identify novel materials or compounds with useful properties has been increasingly relied on through the years(column 1, lines 11-16).

In reference to claim 10, Anderson et al. teach, in paragraphs 7 (lines 63-67) to paragraphs 8 (lines 1-60), applying the herbicidally active compounds to plants to verify herbicidal activity.

Finding of prima facie obviousness

Rationale and Motivation (MPEP 2142-2143)

It would have been obvious to a person of ordinary skill in the art at the time of the instant application to combine the teachings of Anderson et al., Koshiba et al., and Vanmaele et al. to devise a method of identifying herbicidally active substance where the enzymatic activity is determined spectroscopically and the test substances are identified in the form of a high-throughput-screening. HPLC is a popular analytical method because is not limited by the volatility or stability of the sample compound and it has many applications including separation, identification, purification, and quantification of various compounds. HTS is another commonly used, popular method where discrete compounds are tested in parallel so that large numbers of test compounds are screened for useful properties.

Conclusion

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public

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PAIR. Status information for unpublished applications is available through Private PAIR Only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Courtney Brown, whose telephone number is 571-270-3284. The examiner can normally be reached on Monday-Friday from 8 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, Jeffrey Stucker can be reached on 571-272-0911. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Courtney A. Brown



JEFFREY STUCKER
SUPERVISORY PATENT EXAMINER